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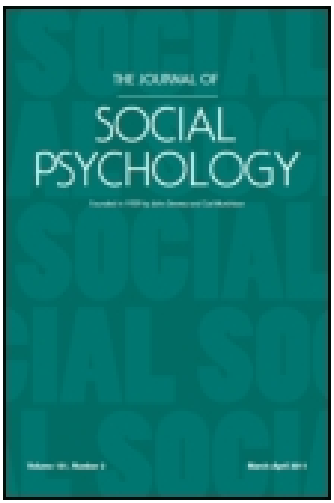

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The Journal of Social Psychology, 1940, **11**, 313-324.

DOMINANCE-QUALITY AND SOCIAL BEHAVIOR IN INFRA-HUMAN PRIMATES*[1]

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This paper is an attempt to outline in tentative fashion a hypothesis concerning the correlation between quality or type of dominance to be found in various families of infra-human primates, and the social behavior and group organization to be found in these families.[2] Such a presentation seems to be justifiable in spite of the paucity of necessary data, because of its probable usefulness in the event that further accumulation of data shows it to be valid. This usefulness is of the following nature: (*a*) It may give another centrally organizing principle to the study of animal sociology, and (*b*) it suggests a new approach to the problem of how human social behavior and group organization may be based on individual personality. Any attempt to link individual with group behavior is important enough to warrant even tentative presentation, especially if the hypothesis itself suggests new lines of attack that will determine whether the hypothesis stands or falls.[3]

Accordingly, I shall attempt to demonstrate the following three

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[1]This paper, in condensed form, was presented at the 1935 meeting of the A.P.A.

[2]These three main groupings are (*a*) the anthropoid apes which include gorilla, chimpanzee and orang-outan (Family Pongidæ) (*b*) the catarrhine or Old-World monkeys which include the baboons, macaques, langurs, mangabeys, etc. (Family Cercopithecidæ); (*c*) the platyrrhine or New-World monkeys, which include the howlers, woolly, cebus, spiders, etc. (Family Cebidæ). There are other families but the writer has had little experience with them. The writer wishes to emphasize that he feels he is riding rough shod over many real differences when he lumps diverse species into a single group. In this particular connection, however, this crude procedure is somewhat justified by the fact that the search is for similarities and not for differences.

[3]This paper was completed in substantially its present form in 1934-5 but was not published because of the disagreement expressed by Drs. Zuckerman and C. R. Carpenter, two notable authorities in the field. Since then further observations by the writer have convinced him increasingly of the probable validity of the hypothesis. The writer wishes to express his thanks to Drs. Zuckerman and Carpenter for their careful criticism of the paper.

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subsidiary hypotheses into which the problem may be divided; (*a*) That different kinds or qualities of dominance behavior are demonstrable in the three main families of infra-human primates that have been studied; (*b*) that different kinds of social behavior and group organization may be found in the two families, for which we have adequate data; (*c*) that these differences are correlated.

Although it has been demonstrated that dominance plays an important role in lower animals, we shall confine our discussion to infra-human primates (15, 16, 17, 6).

With regard to our first point, that there exist considerable variations in quality or kind of dominance, this is very obvious to anyone who has worked with more than one of the three main groups that have been experimentally studied (platyrrhine, catarrhine, and anthropoid). It is particularly well brought out by the technique the writer has developed of studying the animals quantitatively in pairs that have been matched for species, sex, age, size, and weight, in order to bring out the more delicate factors in the determination and expression of dominance that are ordinarily obscured by sexual dimorphism, endocrinological differences, and unlimited space in which to react (10). A pair of rhesus macaques (*catarrhine*), a pair of cebus monkeys (*platyrrhine*), and a pair of chimpanzees (*anthropoid*), in the same experimental situation will all behave in different ways. While in all three pairs it will be possible to determine which animal of the pair is dominant and which subordinate, and while in all three pairs the nature of the total dominance syndrome will be *generally* comparable, still the *specific* nature of the behavior will be different. The dominant animal in all three pairs will be the more aggressive, but the quality of the aggressiveness will differ considerably. The dominant animal in all three pairs will play the masculine rôle and the subordinate animal will play the female rôle, but the quality and quantity of this relationship will differ.

It would be possible to describe in great detail all the differences that exist, but so organized are these differences that it is possible to describe them by their general character. We may say that dominance in the chimpanzee is mostly of a friendly kind, that dominance in the macaque is usually brutal in nature, and that dominance in the cebus is in the first place tenuous and in the second place relatively non-contactual. We have, unfortunately, had too few chim-

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panzees to work with to be positive about our generalization. Let it be understood that what we say about these animals is based on the useful discussions in the literature, and on direct observation of one pair of young chimpanzees at Vilas Park Zoo, in Madison, Wisconsin; one group of three young chimps at Central Park Zoo; one group of four young adult animals (later separated into two pairs) at Central Park Zoo; and a young female chimp and a female gorilla pair at Bronx Park Zoo. Slight contact with old adults indicates that they may show entirely different dominance-quality from young animals. Older animals apparently become vicious and wild after a certain age.

The dominant chimpanzee (at least in young animals) is a friend and a protector of the subordinate chimpanzee. The subordinate animal shows no fear of his partner, nor does he avoid or run away from him. They form a close contact group and are dependent on each other, frequently becoming so inseparable that isolation for experimental purposes is a disturbing factor, so much will they miss one another. They will share their food, they will play together, and aggression will take the form of rough play or teasing rather than of brutal and wanton attack. Chimpanzees in pairs are rarely scarred, whereas other animals will very often show by their scars the life and death nature of the dominance relationship obtaining in their pairings. In moments of stress or danger, the subordinate chimpanzee will fly to the arms of his dominant partner for protection and comfort, at least in the young animal. In the pair of young chimpanzees that we studied, injury to the one was resented by the other, and they were, in general, inseparable.

The subordinate chimpanzee actually shows anger more often than the dominant one. In our young pair, the dominant male would often tease the subordinate female to the point of complete exasperation. In such cases she would fly into a towering screaming rage, and chase him about the cage in the attempt to vent her annoyance upon him. He would run away laughing. This behavior has never been seen in any other animal although it is seen frequently in the chimp. The subordinate macaque never runs at the overlord, nor does the overlord ever flee.

In a group of three young chimpanzees, the smallest and least dominant formed a contact pair with the second dominant animal. This latter animal was her protector and guardian but preferred

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to play with the most dominant male who was much more active. In one observation when the smallest animal felt generally fearful, (as evidenced by her continual whimpering and attempts to snuggle close to her protector), she resented fiercely the attempts of the biggest animal to take her protector away in order to play. Finally such was her resentment that she attacked the overlord of the group and pummeled him with her fists. When he laughed and ran away, she turned to her guardian and snuggled close to her again. In a cage of macaques, such a pummeling of the overlord would be a life and death matter. In the chimpanzee it called forth the laughing response.

We have, in adult groups, observed the subordinate animal, for one reason or another, become very angry and go into a fit of screaming and chasing the other animals about the cage. Such a tantrum has never resulted in a fight. The other more dominant get out of her way until the screaming stops.

The behavior in the macaque pair will, ordinarily, be very different from this chimpanzee behavior. Catarrhine dominance is rough, brutal and aggressive; it is of the nature of a powerful persistent, selfish urge that expresses itself in ferocious bullying, fighting, and sexual aggression. The subordinate animal is usually afraid of the dominant animal, and is frequently completely terror-stricken and cowed. These animals never show anything that could possibly be called friendship for their fellows.[4] A weak or sick animal is often killed by his fellows who seize the opportunity to take advantage of his weakness (12). A very subordinate animal is in danger of starving if the supply of food is limited, for the overlord may take it all. The behavior of the subordinate animal almost always shows the effect of this social relationship of brutal dominance; his behavior is always oriented with respect to the dominant overlord. He will almost always avoid the overlord, he will look around fearfully before eating or playing or exploring. His very posture shows fear, for he will slink slowly and carefully about the cage, whereas his dominant partner strides about as if he were alone. Previous papers in this series discuss many examples of such behavior, and the reader is referred to them for more detail. This picture holds true roughly for all the catarrhine monkeys studied by the writer

[4]Apparently they *may* show friendship for humans, according to Zuckerman (private communication).

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(rhesus macaques, pigtails, baboons of various kinds, java monkeys, etc.) although some more minute differentiations may be made among these various species.

Platyrrhine monkeys may also be tentatively lumped in one group for the sake of this treatment. The writer's experience has been with various kinds of cebus and spider monkeys and with a few woolly monkeys. With these animals may be grouped the howler monkey, for there is nothing in Carpenter's monograph (4) on these animals that contradicts the writer's experience with other platyrrhine animals. These animals are generally low in dominance expression and at times it even appears as if dominance is not expressed in their behavior. Careful long-time study will show, however, that it is present and discernible, even though it exists in a much less marked form than in the other animals we have discussed. For the catarrhine monkey, the dominant animal of a pair may usually be detected a few minutes after they have been together. It takes somewhat longer to diagnose dominance in the chimpanzee, but it takes a very long time indeed for the cebus monkey. When it *has* been established, it is never as clear cut as it is in the catarrhine animal. Where in the latter animal, the subordinate animal may get not a single bit of food out of the 20 bits dropped in (see 10, for description of our food test for dominance), the platyrrhine subordinate may get five or even more out of 20 bits of food, and there will rarely be any squabbling about food, nor any attacks on a subordinate animal by the dominant animal because of food. Their dominance is not often harsh or brutal, and there is little of the persistent sadism so often seen in the rhesus pair. The subordinate cebus will usually show less fear than the rhesus subordinate, and may at times even be aggressive toward the dominant animal. The platyrrhine animal, to a much greater extent than any of the other animals, use vocalizations as an expression of dominance. The prize example is, of course, found in the howlers, but this is also true for the cebus and the woolly monkey. A platyrrhine animal, attacked, is less apt to fight or to struggle, than he is to scream and cry in ever increasing intensity until he is let go.

Probably the most important and most interesting social characteristic of platyrrhine animals is that they pay little attention to each other either in pairs or in large groups. They form very loosely cohering pairs, which may rarely be considered to be units

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as is the case in the chimpanzee. They rarely show anything that may be called friendship, or protection or dependence on each other, but neither do they bother each other very much. Their rôles in sexual behavior are almost never as fixed as they are in the rhesus, or even in the chimpanzee. A subordinate animal may frequently mount the dominant animal although generally it seems to be true that the dominant cebus also plays the masculine rôle more often than does the subordinate animal.

Our discussion of the group behavior of infra-human primates and its correlation with dominance-quality must confine itself largely to the platyrrhine and catarrhine groups, since very little that is useful for our present purpose has been published for the anthropoid ape. Otherwise excellent field studies have been deficient in descriptions of group behavior and organization in these animals. The writer has had the opportunity to observe ape groups under zoo conditions only, and very few of these. The description of anthropoid sociology is an important task that as yet remains largely undone.

The classical description of social behavior among catarrhine animals is Zuckerman's description of the Hamadryas baboon in the wild and in a large group at the London Zoo (22). These animals, and also the catarrhine groups observed by the writer under zoo conditions, show a definitely organized society with strongly hierarchical social status. The baboon horde is a grouping of a large number of separate families, each of which is composed of an overlord male, as many females as he can secure and hold by his dominance and fighting ability, their offspring, and, that peculiar phenomenon, the bachelor baboon. This latter animal is a male who has not been dominant enough to secure any females for himself. The females of the family, in spite of the fact that they are sexually unavailable to him, continue to exert sufficient sexual attraction upon the bachelor to keep him loosely tied to the family grouping.

The females are definitely "owned" by the overlord and are unavailable to any other male. Zuckerman records only three instances of "unfaithfulness" between a wife and a bachelor baboon in all his observations. As might be expected, there are many ferocious fights for these females, fights in which lives are sometimes lost. There is much homosexuality in these animals.

If we may, for the purposes of this paper, follow the procedure of lumping all catarrhine animals together, it is possible to reason

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from the dominance-quality we have already discussed for pairs of catarrhine animals to the social organizations of the baboon, which is also a catarrhine animal. We have seen the strong persistent urge to selfish, aggressive dominance that the individual animal displays in the pair, and it is easy to see the connection between such a quality of dominance and the ferocious fighting that the baboon displays in the group. We should expect dominance status to be jealously guarded and affirmed. This we find to be true in the group. We find also, what seems to be a natural concomitant of catarrhine dominance-quality, the strongly hierarchical social organization, the definite family groupings, and the exclusive ownership of the female, since sexual attempts on her are also an attack on the dominance of her owner. It is easy to see also how the phenomenon of the bachelor baboon with its enforced celibacy is a consequence of catarrhine dominance-quality. Homosexuality, as we have shown in a previous paper (11), is also an expression of dominance, and we should as a consequence expect to find more homosexuality where dominance struggle exists. Of course we should also expect to find it as a product of enforced celibacy. Zuckerman's observations have been confirmed by our observations of other catarrhine groups in zoos.

It would seem then that certain social consequences flow at least in part as a natural and to-be-expected accompaniment of a certain dominance-quality. This is not to say that this one factor alone is responsible. This can also be shown to some extent for the platyrrhine.

The writer will rely here for his discussion of social behavior in platyrrhine groups on his own observations of cebus groups under zoo conditions and on Carpenter's brilliant monograph on the social behavior of the howler monkey in the wild (4).

The howlers are organized in homogeneous, closed "clans"[5] in which there is very little consistent and permanent internal grouping of, for instance, the family type (the sub-groupings that are seen are temporary). To be sure, there is some evidence of preference by a female for one male over another when she is sexually receptive, and the more usual sexual behavior reported by Carpenter is of single male-female pairings who remain associated until the male is sexually satiated. This is very different from the situation

[5]The word "clan" is apparently not used in the anthropological sense by Carpenter.

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to be observed in baboons and macaques, however, for there is little or no fighting between males for the receptive female, and no jealousy to speak of is reported by Carpenter, at least not of the vicious baboon type. While, as has been said, the receptive female shows some preference as between two available males, still, to quote from Carpenter:

> So far as I could ascertain, the female which was receptive but unassociated with a male displayed invitational behavior with reference to the most convenient male. This usually meant the one nearest her. If he did not respond, another one was tried. Once I observed two males respond almost simultaneously to the lingual gestures of a female. . . . The one which arrived first copulated with her and remained a close consort for many hours. The second male followed the consorts , . . , but there was never observed any vigorous competition between the two males for access to the female. . . . . It would seem that the sexual relations of howler males and females should not be classed as polygamous or monogamous, but if a classification is to be made, the relations might be called *communal* (pp. 91-92).
>
> When a female comes into a state of oestrus, and becomes associated with a highly motivated male, primary sexual activity occurs with great frequency. Following an initial period of a few hours, there is a rather rapid decline in the frequency curve to the point at which the first male becomes satiated and discontinues association with the female. The female may then become the consort of another highly motivated male. . . . In this manner two or more males may be satiated by a female during an oestrus period. I have observed five instances of different males copulating with the same oestrus female, and I am convinced that typically more than one male copulated with a female during her period of receptivity (p. 91).

There is no "ownership" of the female among the howlers, as there is among the baboons, for the male-female "exclusive" relationship lasts for no more than a few hours. Neither is there much, if any, of the homosexual behavior which is so common in the baboon.[6] The vicious bullying and ferocity to be observed in catarrhine monkeys is almost totally absent in the howler as well as

[6]At least it cannot be as common as in the baboon. A personal communication from Dr. Carpenter says "There is no information as to whether or not howlers are at times homosexual."

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in the woolly monkey and the cebus.[7] The main mechanism for expression of dominance has now become vocalization. The social hierarchy is very weak, or, to phrase it in another way, has a low gradient. There is little of either coöperation or competition. It is impossible to select out "rulers" or over-lords in these animals.

To the writer it seems obvious that this general picture "goes with" the dominance-quality we have already described for the platyrrhine, just as the baboon social picture naturally "goes with" the catarrhine dominance-quality. While there is little justification or usefulness in speaking of causal priority for either the dominance-quality or the social organization, it is certainly justifiable to point out the correlated status of the two groups of data. The writer is quite willing to concede the possibly questionable character of his assumption that all catarrhine animals may be lumped in one group, and that all platyrrhine animals may be lumped in another group. In favor of such an assumption, however, is the fact that the writer's experience, while confirming the existence of species differences within the catarrhine and platyrrhine group, indicates that these differences are less important than the wide and important differences between the two main groups. In any case, this is all subject to experimental and observational verification or disproof, and the hypothesis presented here will have amply justified its existence if it stimulates the search for these very important facts.

Zuckerman's noteworthy attempt (22) to base animal sociology on the sexual physiology of the species as well as on dominance and a few other factors, is particularly interesting in view of the foregoing discussion. We have already disagreed with this interpretation of primate sociology in a previous paper (11), but the impressive mass of data that he accumulates in support of his thesis cannot be brushed aside lightly, especially in view of the fact that recent work in sub-primates indicates a close correlation between dominance behavior and sexual physiology. It may be that different explanations are necessary for primates, chickens, and lizards, or what is even more likely, the moral may be the old one that simple explanations in terms of one causal factor are not often likely to be valid. We should then more cautiously affirm that dominance-quality is at least one factor that correlates with social behavior.

[7]The howler may be quite ferocious in his attacks on the isolated male who attempts to join the clan group. The play-fighting among the juvenile animals may also become rough enough to be called real fighting.

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The implications of such a hypothesis (that some organization and group behavior are at least partially correlated with deep characteristics of the "individual" personality), are far-reaching and important. Since dominance as a function of the individual is susceptible of careful scientific study, with probable eventual experimental control and prediction, we may yet be able to lay bare on a scientific basis the psychological and physiological basis of sociological science. There is no reason apparent at the moment why the techniques and hypotheses that have come from the study of infra-humans may not be partially applicable to the similar scientific study of the human.[8]

It is at least conceivable that differences in human cultures may be significantly correlated with some isolable variation of one or a few fundamental dimensions of personality. The question of genic versus social determination of these personality factors is not necessarily involved in such a general consideration. It is possible, for instance, to make a comparison, crude though it may be, between baboon dominance-quality and the similar behavior of the Mundugumor of New Guinea. A study of the social forms that are correlated with baboon dominance-quality in humans does not require a preliminary determination of the relative influence of genic and social factors in the etiology of this dominance-quality.

This study need not be confined to differences *between* cultures. A study now in progress on individual differences in dominance-quantity and quality in a very restricted cultural sub-group indicates also that such individual differences may be very potent determiners of different qualities of social behavior within the one cultural group, even to the extent of some evidence of correlation between widely deviant dominance-quantity and widely deviant social and sexual behavior.

Another cultural problem that might conceivably be helped to solution by the use of our concepts is the problem of differential resistance to acculturation by various peoples. It would seem likely that the quality and quantity of dominance which the normal personality showed in that cultural group would help us to understand why he should resist the foreign influences to which a nearby culture succumbs so readily.

[8]Such studies have been made by the writer since the above was written. See *Psychol. Rev.*, 1937, **44**, 404-429; *J. Soc. Psychol.*, 1939, **10**, 3-39; and forthcoming papers.

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